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Efficacy Evaluation of Foliar Fungicides in Field Corn with Low Disease Pressure in Central Nebraska, 2011

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CORN (*Zea mays* L. 'DKC 62-54')
Gray leaf spot; *Cercospora zeae-maydis*
Common rust; *Puccinia sorghi*

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A foliar fungicide efficacy trial was conducted at the University of Nebraska-Lincoln South Central Agricultural Laboratory near Clay Center, NE. Dekalb corn hybrid DKC 62-54, rating of "good" (6 out of 9) for gray leaf spot (GLS) and "excellent" (2 out of 9) for common rust (CR), was planted on 3 May in 30 in. rows with a target population of 32,000 plants/A. The trial area was disked with a crop history of seven years of continuous corn. On 9 May before plant emergence, a herbicide program of Roundup (1 pt/A), Verdict (16 fl oz/A) and Atrazine (1 lb/A) was applied to the trial site. Ten treatments and a non-treated control were replicated six times in a randomized complete block design. Each plot was four rows (10 ft) wide by 40 ft in length. Foliar fungicides were applied with a modified high-clearance sprayer. The 10 ft spray boom consisted of six nozzles (TeeJet XR11002) spaced 20 in. apart and 18 in. above the canopy. Each treatment was applied at 40 psi traveling 3.0 mph resulting in a 20 gal/A application volume. Foliar fungicides were applied on 16 Jul (VT/R1). GLS and CR disease severity was assessed by estimating percent leaf area covered with lesions over the entire plot on 13 Jul (V18), 1 Aug (R3), 12 Aug (R4) and 25 Aug (R5, milk line ¼ down from the kernel top). These data were used to calculate area under the disease progress curve (AUDPC). Corn lodging was assessed on 7 Oct as the percentage of corn stalks lodged below the ear from 50 stalks pushed from the standing 12 o'clock position to the 2 o'clock position (45^{o} angle). Stay green percentage was assessed on 19 Sep as the percentage of green leaf material remaining on the plant averaged through the plot. All data assessments were taken from the two center rows of each plot, except push lodging was done in the two outside rows. Grain was mechanically harvested with a two-row research combine on 19 Oct. The ends of plots were trimmed prior to harvest and the harvested area of each plot was measured following harvest and used to calculate yield. Data were subjected to analysis of variance and means were compared at the 0.05 significance level using Waller-Duncan k-ratio t test. Monthly rainfall and temperature readings recorded at South Central Agricultural Lab were relatively normal during the growing season although temperatures did get very warm during the VT and R1 growth stages. However, scouting observations of corn ears did not indicate that temperatures appeared to affect kernel and ear development. Supplemental water was added to this trial as needed by an overhead sprinkler linear irrigation system.

GLS was the predominant foliar disease present in this trial. Percent severity remained low and fairly level through the growing season with lesions being identified on the ear leaf by early Aug. GLS was not visually observed at the time of the VT/R1 application and did not exceed 2.2% for any treatment on any assessment date. CR severity was 0.1% at the time of the VT/R1 application and did not exceed 0.6% for any treatment on any assessment date. Common smut, Physoderma brown spot, anthracnose and southern rust occurred at very low severity levels and their severity was not assessed. The area under the disease progress curve calculations indicated all foliar fungicide treatments reduced GLS and CR severity as compared to the non-treated control. There were no statistical differences between treatments for lodging as percentages ranged from 2.0% for Stratego YLD, 4 fl oz/A to 9.7% for Aftershock, 2 fl oz/A and Quilt, 14 fl oz/A. Among all treatments, the non-treated control had the lowest stay green percentage (23.7%) while Stratego YLD, 4 fl oz/A had the highest stay green percentage (29.4%). There were no significant differences among treatments for 500-count kernel weights. There were no statistical differences in grain moisture as moisture percentages at harvest ranged from 14.0% to 14.3%. There were statistical differences between treatments for yield. Quilt, 14 fl oz/A and Stratego YLD, 4 fl oz/A were the highest yielding treatments with 238.7 bu/A and 237.2 bu/A, respectively.

Treatment, Rate/A	GLS AUDPC[z]	CR AUDPC	Lodging (%)[y]	Stay Green (%)[x]	500 Kernel Weight (oz)	Grain Moisture (%)	Dry Yield (bu/A)[w]
Non-Treated Control……..…….	51.2 a[v]	13.9 a	5.6	23.7 b	6.21	14.0	231.0 ab
Headline 2.09 SC[u], 6 fl oz……....	11.9 d	8.0 b	8.7	26.3 ab	6.20	14.3	229.5 ab
Headline AMP 1.67 SC[u], 10 fl oz...	16.3 cd	8.7 b	4.0	27.6 ab	6.22	14.2	228.9 ab
Priaxor 4.17 SC[u], 4 fl oz…….....	14.7 cd	8.0 b	5.7	28.9 a	6.28	14.2	233.0 ab
Quilt Xcel 2.2 SE[u], 10.5 fl oz….....	11.8 d	8.4 b	3.6	26.8 ab	6.16	14.4	232.7 ab
Stratego YLD 4.18 SC[u], 4 fl oz…....	19.1 bc	9.5 b	2.0	29.4 a	6.33	14.1	237.2 ab
Evito 480 SC[u], 2 fl oz……..….	18.4 bc	12.7 a	6.0	24.1 b	6.24	14.1	224.0 b
Evito T 480 SC[u], 5 fl oz……..….	18.0 bc	8.6 b	5.6	26.8 ab	6.21	14.4	225.2 b
Quadris 2.08 SC[u], 9 fl oz……..….	14.2 cd	9.2 b	5.7	27.6 ab	6.19	14.1	232.9 ab
Aftershock 480 SC[u], 2 fl oz..……	22.9 b	9.0 b	9.7	25.9 ab	6.21	14.3	226.5 ab
Quilt 1.66 SC[u], 14 fl oz……..….	12.3 d	9.3 b	9.7	25.9 ab	6.21	14.0	238.7 a
Coefficient of Variation (%)	25.6	25.2	81.8	10.6	2.2	2.9	3.5

[z]Area under the disease progress curve.
[y]Lodging was estimated as the percentage of corn stalks lodged below the ear from 50 stalks pushed to arm's length.
[x]Stay green was estimated as the percentage of green leaves remaining on the plant.
[w]Yield calculations adjusted to a moisture content of 15.5%.
[v]Data followed by the same letter or without letters within a column are not statistically different ($P > 0.05$) according to the Waller-Duncan k-ratio t test.
[u]Treatment included non-ionic surfactant (NIS), 0.25% V/V